



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/584,786

06/28/2006

Alain Ravex

Serie 6486

4981

40582

7590

04/29/2010

AIR LIQUIDE USA LLC

Intellectual Property

2700 POST OAK BOULEVARD, SUITE 1800

HOUSTON, TX 77056

EXAMINER

PETTITT, JOHN F

ART UNIT

PAPER NUMBER

3744

MAIL DATE

DELIVERY MODE

04/29/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/584,786	Applicant(s) RAVEX ET AL.	
	Examiner John F. Pettitt	Art Unit 3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 January 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>1/14/2010</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 10-17, 19-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peschka (4,386,309) in view of Moiseev (5,226,299) and Lak et al (2004/0256395).

Peschka discloses applicants' basic inventive concept, a hydrogen storage installation in a vehicle with an insulated liquid hydrogen tank (1), a pipeline for extracting liquid hydrogen (8), a circuit (10) for removing gaseous hydrogen and feeding the gaseous hydrogen to a fuel cell (14) which is used to power a refrigeration system (23) which cools a radiation shield (metal screen) in the hydrogen tank, substantially as claimed with the exception using closed cell polyurethane as an insulator. Moiseev shows metal screen 2 cooled by vaporizing cryogen (through inlet 7), with the screen between insulation layers (see line 46 of column 4 and line 31 of column 6). Lack et al show

Art Unit: 3744

closed cell polyurethane (paragraph 32) on both sides of a metal support (paragraph 33), to be old in the cryogenic liquid container art. It would have been obvious to one of ordinary skill in the art at the time of applicants' invention from the teaching of Moiseev and Lak et al to modify the hydrogen storage installation of Peschka by using a metal screen cooled by exiting vapor as taught by Moiseev and closed cell polyurethane insulation as taught by Lak to provide efficient long term storage of liquid hydrogen. In regard to claims 11-13, figure 8 of Moiseev shows multiple structurally stable vapor cooled screens, with one located inside the other. In regard to claims 15 and 16, figures 1 and 10 of Moiseev show the formation of the screen using multiple plates with troughs formed in the plates. With regard to claim 19, Peshka teaches that the circuit (10) has an inner end (part of 10 inside 2) emerging in an upper part of the tank (2) and an outer end (10, 12), the outer end (10, 12) being the portion of the circuit (10) that is connected to the hydrogen inlet (13) of the fuel cell (14). With regard to claim 20, Moiseev teaches that said at least one first metal screen (2) comprises at least an inner screen and an outer screen (see Figures 1, 4, 8; column 4, lines 38-39). Further, Moiseev explicitly teaches that the vapor exiting the tank (4) provides cooling by running along in heat exchange relationship with the screens (shields; column 4, lines 25-30). With regard to claim 21, Peschka teaches that the tank contains liquid hydrogen (column 1, line 35). With regard to claim 22, Moiseev teaches that the screens are between insulation layers. With regard to claim 23, Lak teaches the use of foam for the provision of insulation rather than vacuum insulation as stated in the rejection above. Further, it is noted that foam insulation is a well known alternative to vacuum insulation, and those of

Art Unit: 3744

ordinary skill in the art routinely select one or other depending on the application at hand. Further it is noted that vehicle applications are well known for the demanding strong, reliable, and passive insulation as is taught by Lak (parag. 1, 8, 14).

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Peschka (4,386,309) in view of Moiseev (5,226,299) and Lak et al (2004/0256395) as applied to claims 10-17 above, and further in view of Miyajima et al (2005/0173170) or Lechner (2004/0211192). Peschka, as modified, discloses applicants' basic inventive concept, a hydrogen storage installation for a vehicle with a fuel cell to produce electricity for use within the vehicle, substantially as claimed with the exception of using the fuel cell to provide propulsion to the vehicle. Miyajima et al (with fuel cell 11 powering propulsion motor 31) and Lechner (paragraph 11) each show this feature to be old in the fuel cell art. It would have been obvious to one of ordinary skill in the art at the time of applicants' invention from the teaching of either Miyajima et al or Lechner to modify the vehicle mounted hydrogen powered fuel cell of Peschka by using the fuel cell to provide propulsion for the vehicle to provide efficient, clean propulsion.

Claims 10-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kema (NL 1018316) in view of Moiseev (5,226,299) and Lak et al (2004/0256395). Kema discloses applicants' basic inventive concept, a hydrogen storage installation in a vehicle with an insulated liquid hydrogen tank (3), a pipeline (vent) for extracting liquid hydrogen (in 3), a circuit (7) for removing gaseous hydrogen and feeding the gaseous

Art Unit: 3744

hydrogen to a fuel cell (6) which is used to power a refrigeration system (14) which cools a radiation shield (5) in the hydrogen tank (3), and solid insulation (4) substantially as claimed with the exception using closed cell polyurethane as the insulator. Moiseev shows metal screen 2 cooled by vaporizing cryogen (through inlet 7), with the screen between insulation layers (see line 46 of column 4 and line 31 of column 6). Lack et al show closed cell polyurethane (paragraph 32) on both sides of a metal support (paragraph 33), to be old in the cryogenic liquid container art. It would have been obvious to one of ordinary skill in the art at the time of applicants' invention from the teaching of Moiseev and Lak et al to modify the hydrogen storage installation of Kema by using a metal screen cooled by exiting vapor as taught by Moiseev and closed cell polyurethane insulation as taught by Lak to provide efficient long term storage of liquid hydrogen. In regard to claims 11-13, figure 8 of Moiseev shows multiple structurally stable vapor cooled screens, with one located inside the other. In regard to claims 15 and 16, figures 1 and 10 of Moiseev show the formation of the screen using multiple plates with troughs formed in the plates. With regard to claim 19, Kema teaches that the circuit (7) has an inner end (part of 7 inside 3) emerging in an upper part of the tank (3) and an outer end (7 near 6), the outer end (7 near 6) being the portion of the circuit (7) that is connected to the hydrogen inlet of the fuel cell (6). With regard to claim 20, Moiseev teaches that said at least one first metal screen (2) comprises at least an inner screen and an outer screen (see Figures 1, 4, 8; column 4, lines 38-39). Further, Moiseev explicitly teaches that the vapor exiting the tank (4) provides cooling by running along in heat exchange relationship with the screens (shields; column 4, lines 25-30).

Art Unit: 3744

With regard to claim 21, Kema teaches that the tank contains liquid hydrogen (abstract).

With regard to claim 22, Moiseev teaches that the screens are between insulation layers. With regard to claim 23, Lak teaches the use of foam for the provision of insulation rather than vacuum insulation as stated in the rejection above. Further, it is noted that foam insulation is a well known alternative to vacuum insulation, and those of ordinary skill in the art routinely select one or other depending on the application at hand. Further it is noted that vehicle applications are well known for the demanding strong, reliable, and passive insulation as is taught by Lak (parag. 1, 8, 14). With regard to claim 18, Kema, as modified, teaches a hydrogen storage installation for a vehicle with a fuel cell to produce electricity for use within the vehicle and using the fuel cell to provide propulsion to the vehicle (via 10).

Response to Arguments

Applicant's arguments filed 1/14/2010 have been fully considered but they are not persuasive.

1. It is noted that a copy of the foreign patent to Kema and provided by the applicant is only being included to ensure expedited processing at the office.

2. Applicant's arguments (page 8) are that "the combination of" of the references "would not have resulted in the claimed subject matter because the circuit of Peshka supposedly does not perform the function of feeding hydrogen to a fuel cell and having at least one portion that is in a heat exchange relationship with the first screen". In response to the applicant's arguments, the examiner disagrees and directs the applicant

Art Unit: 3744

to fact that circuit (12) feeds hydrogen to fuel cell (14) and that the circuit will inherently cool shield (5) as fluid flows therethrough. Therefore the rejection is maintained.

3. Applicant's arguments (page 10) are that "regardless"..."if one of ordinary skill in the art were to combine the above teachings of Peschka and Moiseev, it would have resulted in a cryogenic storage system including a gaseous hydrogen discharge tube 10 (which is separated from radiation shields by non-thermal bridging connections 4) for powering a fuel cell 14 and a separate and dedicated channeled radiation shield (as per Moiseev) exhausting gaseous hydrogen". In response to the applicant's arguments, the examiner disagrees with the allegation at least because the applicant has provided no reason why one would provide separate vapor streams. It is considered that the nexus of the references teaches using the vapor from the tank for the fuel cell (Peschka) and for cooling radiation shields for improved storage (Moiseev). Therefore the allegation is unpersuasive. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John F. Pettitt whose telephone number is 571-272-0771. The examiner can normally be reached on M-F 8a-4p.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler or Frantz Jules can be reached on 571-272-4834 or 571-272-6681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

Application/Control Number: 10/584,786

Page 9

Art Unit: 3744

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John F Pettitt /
Examiner, Art Unit 3744

/Cheryl J. Tyler/
Supervisory Patent Examiner, Art
Unit 3744

JFP III
April 20, 2010